

AMENDMENT
(under Article 11)

To: Yoshinori Hagiwara, Esq.,
The Examiner of the Patent Office

1. Indication of the International Application
PCT/JP03/14074

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4. Object of the amendment:

Specification, Scope of Patent Claims and Drawings

5. Contents of Amendment

(1) In page 2, line 18, amend "so as to send" to
--so as to send, and the operation control portion of
the equipment to be monitored and the connection
processing means are connected via a signal converting
means, and the signal converting means converts between
a short-distance transmission signal to the operation
control portion side and a long-distance transmission
signal to the connection processing means side --.

(2) In page 2, lines 20 to 25, delete "the operation

control portion of the equipment to be monitored and the connection processing means are connected via a signal converting means, and the signal converting means converts between a short-distance transmission signal to the operation control portion side and a long-distance transmission signal to the connection processing means side.

In accordance with a third aspect of the present invention, there is provided an operation monitoring system as recited in the first aspect or the second aspect, wherein".

(3) In page 3, lines 1 to 2, amend "In accordance with a fourth aspect of the present invention, there is provided an operation monitoring system as recited in the second aspect or the third aspect" to -- In accordance with a third aspect of the present invention, there is provided an operation monitoring system as recited in the first aspect or the second aspect--.

(4) In page 3, line 4, amend "In accordance with a fifth aspect of the present invention, there is provided an operation monitoring system as recited in any one of the first to fourth aspects" to -- In accordance with a fourth aspect of the present invention, there is provided an operation monitoring system as recited in any one of the first to third aspects--.

(5) In page 3, line 9, amend "In accordance with a sixth aspect of the present invention, there is provided an operation monitoring system as recited in any one of the first to fifth aspect" to -- In accordance with a fifth aspect of the present invention, there is provided an operation monitoring system as recited in any one of the first to fourth aspect--.

(6) In page 14, line 7, amend "In accordance with the operation monitoring system on the basis of the second aspect of the present invention" to --Further--.

(7) In page 14, line 12, amend "third aspect" to --second aspect--.

(8) In page 14, line 16, amend "fourth aspect" to --third aspect--.

(9) In page 14, line 19, amend "fifth aspect" to --fourth aspect--.

(10) In page 14, line 24, amend "sixth aspect" to --fifth aspect--.

(11) In claim 1, amend "so as to send" to --so as to send, and the operation control portion of said equipment to be monitored and said connection processing means are connected via a signal converting means, and the signal converting means converts between a short-distance transmission signal to said operation control portion side and a long-distance transmission

signal to said connection processing means side --.

(12) In claim 2, amend "the operation control portion of the equipment to be monitored and the connection processing means are connected via a signal converting means, and the signal converting means converts between a short-distance transmission signal to said operation control portion side and a long-distance transmission signal to said connection processing means side" to --the connection processing means is provided with an isolation means for insulating and isolating the signal between the signal converting means side and the centralized monitoring means side--.

(13) In claim 3, amend "wherein the connection processing means is provided with an isolation means for insulating and isolating the signal between the signal converting means side and the centralized monitoring means side" to --the signal converting means is provided with an isolation means for insulating and isolating the signal between the monitored equipment side and the connection processing means side--.

(14) In claim 4, amend "as claimed in claim 2 or 3, wherein the signal converting means is provided with an isolation means for insulating and isolating the signal between the monitored equipment side and the connection processing means side" to --as claimed in

any one of claims 1 to 4, wherein the centralized monitoring means is constituted by a data collection server collecting output data from the connection processing means via a communication network, and a monitoring device connected to the data collection server, and sends abnormality detection data detected in the case that the operation state of the equipment to be monitored is abnormal, to a predetermined communication terminal device--.

(15) In claim 5, amend "the centralized monitoring means is constituted by a data collection server collecting output data from the connection processing means via a communication network, and a monitoring device connected to the data collection server, and sends abnormality detection data detected in the case that the operation state of the equipment to be monitored is abnormal, to a predetermined communication terminal device" to --the equipment to be monitored is constituted by a reefer container, and the centralized monitoring means monitors in a centralized manner on the basis of a reception of a device information, an operation information, an abnormality information, an alarm of a communication abnormality and the like in the reefer container--.

(16) Delete claim 6.

6. List of Attached Sheets

(1) Specification pages 2, 3 and 14

(2) Claim page 16

In order to achieve a centralized monitoring of the reefer container as described in Japanese Unexamined Patent Publication No. 7-50882, it is necessary that a power line sending and receiving means (a modem) is mounted to each of the reefer containers, in other words, only the reefer container to which the modem is mounted can be monitored. In particular, a mounting rate of the modem is low in the old reefer container, and a number of comparatively new reefer containers to which the modem is not mounted is not small. Accordingly, a sufficient labor saving effect can not be obtained even by introducing the system as described in the patent document 1. Further, since a serial interface of a control device installed in the reefer container is different in a communication method between manufactures, it is hard to achieve the centralized monitoring in this view.

The present invention is made by taking the problem mentioned above into consideration, and a technical object of the present invention is to provide an effective system for intending a labor saving by remote monitoring an operation condition of an equipment to be monitored such as a reefer container or the like.

Disclosure of the Invention

As a means for effectively solving the technical

problem mentioned above, in accordance with a first aspect of the present invention, there is provided an operation monitoring system comprising:

a connection processing means capable of being connected to an operation control portion in one or a plurality of plural types of equipments to be monitored; and

a centralized monitoring means capable of sending and receiving with respect to one or a plurality of connection processing means via a communication means,

wherein the connection processing means selects a different communication method in accordance with the type of the equipment to be monitored so as to acquire monitoring data, and converts the monitoring data into a predetermined format so as to send, and the signal converting means converts between a short-distance transmission signal to the operation control portion side and a long-distance transmission signal to the connection processing means side.

In accordance with a second aspect of the present invention, there is provided an operation monitoring system as recited in the first aspect, wherein the connection processing means is provided with an isolation means for insulating and isolating the signal between the signal converting means side and the

centralized monitoring means side.

In accordance with a third aspect of the present invention, there is provided an operation monitoring system as recited in the first aspect or the second aspect, wherein the signal converting means is provided with an isolation means for insulating and isolating the signal between the monitored equipment side and the connection processing means side.

In accordance with a fourth aspect of the present invention, there is provided an operation monitoring system as recited in any one of the first to third aspects, wherein the centralized monitoring means is constituted by a data collection server collecting output data from the connection processing means via a communication network, and a monitoring device connected to the data collection server, and sends abnormality detection data detected in the case that the operation state of the equipment to be monitored is abnormal, to a predetermined communication terminal device.

In accordance with a fifth aspect of the present invention, there is provided an operation monitoring system as recited in any one of the first to fourth aspect, wherein the equipment to be monitored is constituted by a reefer container, and the centralized

monitoring means monitors in a centralized manner on the basis of a reception of a device information, an operation information, an abnormality information, an alarm of a communication abnormality and the like in the reefer container.

Brief Description of the Drawings

Fig. 1 is an explanatory view schematically showing a preferable embodiment in which an operation monitoring system in accordance with the present invention is applied to monitoring of a reefer container;

Fig. 2 is a circuit diagram showing a schematic structure of a signal converter 3 in Fig. 1;

Fig. 3 is a block diagram showing an outline structure of a connection processing device 4 in Fig. 1;

Fig. 4 is a block diagram showing a serial communication circuit installed in each of channel boards 42 of the connection processing device 4 in Fig. 3; and

Fig. 5 is a circuit diagram showing a part of the channel boards 42 in Fig. 3.

Best Mode for Carrying Out the Invention

A description will be given below of a preferable embodiment in which an operation monitoring system in

accordance with the present invention is applied to monitoring of a reefer container with reference to the accompanying drawings. Fig. 1 is an explanatory view schematically showing a structure of the operation monitoring system in accordance with the present embodiment.

Reference numeral 1 ($1n+1$, $1n+2$, $1n+3$, ...) denotes a reefer container stored in a container yard existing in ports and harbors in various locations,

In accordance with the operation monitoring system on the basis of the first aspect of the present invention, it is possible to always monitor in a remote and centralized manner the device to be monitored to which the electric power line sending and receiving means is not mounted, and a lot of devices to be monitored which are different in the communication method in accordance with the manufacturer and the type, via the connection processing means, and the abnormality generated in the device to be monitored is immediately informed to the communication terminal of the user. Accordingly, it is possible to make the monitoring by patrol unnecessary. Therefore, it is possible to significantly lighten the labor of the person in charge of management, it is possible to achieve the labor saving, it is possible to immediately respond the generated abnormality, and it is possible to significantly improve a reliability of the management.

Further, since the operation control portion of the equipment to be monitored and the connection processing means are connected therebetween via the signal converting means which converts between the short-distance transmission signal to the operation control portion side and the long-distance transmission signal to the connection processing means

side, the communication can be achieved even if the distance from the operation control portion to the connection processing means is comparatively long.

In accordance with the operation monitoring system on the basis of the second aspect of the present invention, since the signal converting means has the isolation means, it is possible to extend the signal transmission distance between the monitored equipment side and the connection processing means side without being affected by a disturbance such as the indirect lightening stroke or the like.

In accordance with the operation monitoring system on the basis of the third aspect of the present invention, since the connection processing means has the isolation means, it is possible to extend the signal transmission distance between the centralized monitoring means and the communication means without being affected by a disturbance such as the indirect lightening stroke or the like.

In accordance with the operation monitoring system on the basis of the fourth aspect of the present invention, since it is possible to monitor in the centralized manner the equipment to be monitored from the remote place by the data collection server and the monitoring device, and the abnormality generation data

is sent to the monitoring device and the communication terminal device from the data collection server at a time when the abnormality is generated in the equipment to be monitored, it is possible to securely notify the abnormality generation.

In accordance with the operation monitoring system on the basis of the fifth aspect of the present invention, since it is possible to always monitor in the remote manner and manage in the centralized manner the communication abnormality of the reefer container, the optimum temperature abnormality of the temperature inside and with or without the internal abnormality of the operation control portion, it is possible to make the monitoring by patrol unnecessary. Further, since the generated abnormality is immediately notified to the communication terminal device of the user, it is possible to rapidly correspond so as to prevent the perishable food or the like within the container from being damaged.

What is claimed is:

1. (Amended) An operation monitoring system comprising:

a connection processing means capable of being connected to an operation control portion in one or a plurality of plural types of equipments to be monitored; and

a centralized monitoring means capable of sending and receiving with respect to one or a plurality of connection processing means via a communication means,

wherein said connection processing means selects a different communication method in accordance with the type of the equipment to be monitored so as to acquire monitoring data, and converts the monitoring data into a predetermined format so as to send, and the operation control portion of the equipment to be monitored and the connection processing means are connected via a signal converting means, and the signal converting means converts between a short-distance transmission signal to said operation control portion side and a long-distance transmission signal to said connection processing means side.

2. (Amended) An operation monitoring system as claimed in claim 1, wherein the connection processing means is provided with an isolation means for insulating

and isolating the signal between the signal converting means side and the centralized monitoring means side.

3. (Amended) An operation monitoring system as claimed in claim 1 or 2, wherein the signal converting means is provided with an isolation means for insulating and isolating the signal between the monitored equipment side and the connection processing means side.

4. (Amended) An operation monitoring system as claimed in any one of claims 1 to 3, wherein the centralized monitoring means is constituted by a data collection server collecting output data from the connection processing means via a communication network, and a monitoring device connected to the data collection server, and sends abnormality detection data detected in the case that the operation state of the equipment to be monitored is abnormal, to a predetermined communication terminal device.

5. (Amended) An operation monitoring system as claimed in any one of claims 1 to 4, wherein the equipment to be monitored is constituted by a reefer container, and the centralized monitoring means monitors in a centralized manner on the basis of a reception of a device information, an operation information, an abnormality information, an alarm of a communication

abnormality and the like in the reefer container.

6. (Deleted)